Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.   (Currently amended) A system for neural modulation in the treatment of disease, comprising:

(A) a sensor array in electronic communication with a signal conditioning circuit;

(B) a control circuit in electronic communication with said signal conditioning circuit, said control circuit employing a calculation of a measure of chaos;

(C) an output stage circuit in electronic communication with said control circuit; and

(D) a stimulating electrode array, in electronic communication with said output stage circuit.

2.   (Currently amended) A system for neural modulation in the treatment of disease, comprising:

(A) a sensor array in electronic communication with a control circuit that employs a calculation of entropy;

(B) an output stage circuit in electronic communication with said control circuit; and

(C) a stimulating electrode array, in electronic communication with said output stage circuit.

3.   (Canceled).

4.   (Original)   A system as recited in claim 2, said control circuit employing a calculation of a measure of chaos.

5.   (Currently amended)   A system as recited in claim 1, said control circuit employing the a calculation of entropy.

6.   (Canceled).

7.   (Currently amended)   A system as recited in claim 1, said control circuit employing the a calculation of a Lyupanov exponent.

8.   (Currently amended)   A system as in claim 2, said control circuit employing ~~the~~ a calculation of a Lyupanov exponent.

9.   (Currently amended)   A system as recited in claim 1, said control circuit employing ~~the~~ a calculation of a maximal Lyupanov exponent.

10.   (Currently amended) A system as recited in claim 1, said control circuit employing ~~the~~ a calculation of a maximal Lyupanov exponent.

11.   (Currently amended) A system for neural modulation in the treatment of disease, comprising:

~~(A)~~ a system enclosure, in mechanical communication with a calvarium;

~~(B)~~ a control circuit enclosed within said system enclosure and in electronic communication with an output stage <u>circuit, wherein said control circuit employs a calculation of a measure of chaos</u>;

~~(C)~~ a stimulating electrode array, in electronic communication with said output <u>stage</u> circuit.

12.   (Currently amended)   A system for neural modulation in the treatment of disease, comprising:

~~(A)~~ a system enclosure, in mechanical communication with a calvarium

~~(B)~~ a sensor array in electronic communication with a control circuit that <u>employs a calculation of entropy</u>;

~~(C)~~ an output stage circuit in electronic communication with said control circuit; and

~~(D)~~ a stimulating electrode array, in electronic communication with said output <u>stage</u> circuit.

13-14. (Canceled).

15.   (Currently amended) A system as recited in claim 11, wherein said system enclosure <u>encloses</u> ~~enclosing~~ at least one of <u>said</u> ~~sensor array,~~ control circuit, ~~and said~~ output stage <u>circuit, and stimulating electrode array</u>.

16.   (Currently amended)   A system as in claim 12, wherein said system enclosure encloses ~~enclosing~~ at least one of said ~~sensor array,~~ control circuit~~,~~ and said output stage circuit~~, and stimulating electrode array~~.

17-19. (Canceled).

20.   (Currently amended)   A system as recited in claim 11, wherein said control circuit employs ~~ing the~~ a calculation of entropy.

21.   (Currently amended)   A system as recited in claim 11, wherein said control circuit employs ~~ing the~~ a calculation of a Lyupanov exponent.

22.   (Currently amended)   A system as recited in claim 11, wherein said control circuit employs ~~ing the~~ a calculation of a maximal state control.

23.   (Currently amended)   A system as recited in claim 11, wherein said control circuit employs ~~ing the~~ a calculation of seizure prediction.

24.   (New) A system for neural modulation in the treatment of disease, comprising:
       a system enclosure, in mechanical communication with a calvarium;
       a control circuit enclosed within said system enclosure and in electronic communication with an output stage circuit, wherein said control circuit employs a calculation of seizure prediction; and
       a stimulating electrode array, in electronic communication with said output stage circuit.

25.   (New) The system of claim 24 comprising one or more sensors in communication with the control circuit, wherein the one or more sensors are configured to measure one or more signals from a nervous system component of a patient.

26.   (New) The system of claim 25 wherein at least one of the one or more sensors is disposed intracranially.

27.   (New) The system of claim 24 wherein said stimulating electrode array is configured to deliver stimulation to a vagus nerve of a patient.

28.   (New) The system of claim 24 wherein said control circuit is configured to monitor an impedance of the stimulating electrode array.

29.   (New) The system of claim 24 wherein said control circuit comprises a non-linear control law to generate a control law output signal that specifies parameters of a neuromodulation signal that is delivered by the output stage circuit.

30.   (New) The system as recited in claim 24, wherein said control circuit employs a calculation of a measure of chaos.

31.   (New) The system as recited in claim 24, wherein said control circuit employs a calculation of entropy.

32.   (New) The system as recited in claim 24, wherein said control circuit employs a calculation of a Lyupanov exponent.

33.   (New) The system as recited in claim 24, wherein said control circuit employs a calculation of a maximal state control.

34.   (New) A system for neural modulation of a patient for the treatment of epilepsy, the system comprising:

a signal processor configured to process one or more signals received from a patient;

an output assembly in communication with the signal processor, the output assembly being configured to analyze the processed one or more signals for seizure prediction, wherein the output assembly calculates and generates a neural modulation signal when a seizure is predicted; and

one or more electrodes that are in communication with the output assembly, the one or more electrodes configured to deliver the neural modulation signal to the patient.

35.   (New) The system of claim 34 further comprising a system enclosure that is configured to be coupled with a calvarium.

36.   (New) The system of claim 34 wherein the output assembly comprises:

a control circuit that is configured to analyze the processed one or more signals to calculate parameters of the neural modulation signal and generate an output signal; and

an output stage circuit that receives the output signal from the control circuit and generates the neural modulatation signal with parameters that are specified by the output signal.

37.　(New)　The system of claim 34 wherein seizure prediction employs a calculation of entropy.

38.　(New)　The system of claim 34 wherein seizure prediction employs a calculation of chaos.

39.　(New)　The system of claim 34 wherein the one or more signals comprise EEG signals, wherein the seizure prediction employs analyzing spike parameters of the EEG signals.

40.　(New)　The system of claim 39 wherein the spike parameters comprise at least one of peak-to-valley times, valley-to-peak times, positive phase amplitudes, and negative phase amplitudes.

41.　(New)　The system of claim 34 wherein the one or more electrodes deliver the neural modulation signal directly to a vagus nerve.

42.　(New)　A system for neural modulation in the treatment of disease, comprising:
a sensor array;
a signal conditioning assembly in communication with the sensor array;
a control assembly in communication with the signal conditioning assembly, the control assembly employing a calculation of seizure prediction;
an output stage assembly in communication with the control assembly; and
a stimulating electrode array in communication with the output stage assembly.